

# *Liparis tianchiensis* (Orchidaceae), a new species from Gansu, China

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## Abstract

*Liparis tianchiensis* (Orchidaceae, Epidendroideae), a new species from Wenxian County, Gansu Province, China, is described and illustrated, based on morphological characters. *Liparis tianchiensis* is morphologically similar to *L. damingshanensis*, *L. pauliana* and *L. mengziensis* with erect, lax flowered-inflorescences, small persistent floral bracts, small greenish-purple flowers, spreading sepals, free reflexed and linear petals, a lip with 2 calli near the base and an arcuate column. *Liparis tianchiensis* differs from *L. pauliana* by the single and much smaller leaf, shorter sepals and petals, smaller and reflexed oblong lip. It differs from *L. mengziensis* by having fewer and larger flowers and not connate lip apex. The novelty mostly resembles *L. damingshanensis*, but can be readily identified by having longer sepals and a reflexed oblong lip. *Liparis tianchiensis* only occurs in evergreen broad-leaved forest around a mountain lake in Wenxian County, Gansu Province, China.

## Keywords

Malaxideae, morphology, new species, Wenxian County

## Introduction

The genus *Liparis* Richard (1817: 21) belongs to tribe Malaxideae (subtribe Malaxidineae) of the subfamily Epidendroideae (Chase et al. 2015) and comprises approximately 424 species (Plants of the World Online (<https://powo.science.kew.org/>)) with cosmopolitan distribution from the tropics and subtropics to the temperate and alpine regions. Most species in this genus occur in Southeast Asia as well as in Africa, Australia and the Americas (Pridgeon et al. 2005). *Liparis* is easily distinguished from its allies, *Malaxis* Sol. ex Sw. (Swartz 1788: 119), *Oberonia* Lindley (1830: 15) and *Hippeophyllum* Schltr. in Schumann and Lauterbach (1905: 107), based on its floral morphology (viz. resupinate flowers with narrow linear petals and a curved, slightly winged column lacking a foot) (Pearce and Cribb 2002; Chen et al. 2009). The taxonomy of the genus is very confused and inconsistent (Margońska and Szlachetko 2001, 2004; Pridgeon et al. 2005; Liu et al. 2008) and some research indicated that *Liparis* were polyphyletic. Tang et al. (2015) performed molecular and morphological analyses to establish the phylogenetic relationships within Malaxideae, the results supporting the division of *Liparis* into 11 genera, but the intergeneric relationships remain unclear and the genus definition is considerably controversial. Therefore, we tentatively opted to maintain *Liparis* as a broad concept for the present taxonomic treatment. There are approximately 70 species of *Liparis* in China, including many recently described taxa (see Chen et al. (2009); Feng and Jin (2010); Jin (2010, 2011); Wu et al. (2012); Hsu (2013); Li and Yan (2013); Su et al. (2014); Su et al. (2015); Tang et al. (2015); Li et al. (2019); Ya et al. (2021)).

Wenxian County, Gansu Province, is situated in the northwest of China, in a transitional zone between the north subtropical and warm temperate regions. The altitudes vary from 595 to 4072 m. Variations in climate combined with complex topography have resulted in high plant diversity (Li 2014). Although being a biodiversity hotspot in China, the flora of this area is still unknown despite many years of directed fieldwork and research. Several new species have been described in the last decades, such as *Cardamine tianqingiae* Al-Shehbaz & Boufford in Ihsan (2008: 89) (Brassicaceae), *Spiranthes sunii* Boufford & Wen H.Zhang (2008: 261) (Orchidaceae), *Vitis wenxianensis* W.T.Wang (2010: 288) (Vitaceae), *Clematis austrogansuensis* W.T.Wang & L.Q.Li (2011: 285) (Ranunculaceae) and, more recently, *Oreocharis wenxianensis* Xiao J.Liu & X.G.Sun (2021: 182) (Gesneriaceae) and *Saxifraga sunhangiana* T.Deng, X.J.Zhang & J.T.Chen in Zhang et al. (2022: 197) (Saxifragaceae).

Tianchi Lake in Wenxian County is a famous mountain lake in China, covering an area of nearly 1 km<sup>2</sup>, surrounded by mountains, rich in plant diversity. During our field trip around Tianchi Lake in 2021, we collected nearly 20 orchid species, including an unknown *Liparis*. Further examination by means of morphological comparison indicated that it represented a new species, which is described and illustrated here.

## Material and method

Specimens from the single known subpopulation of the putative new species were collected during field expeditions in 2021. Morphological characters of five living plants, including three flowering and two non-flowering individuals, were observed, measured and photographed under an Olympus stereozoom microscope. Specimens were deposited in the Forestry Herbarium of Gansu Agricultural University (**GAUF**), located in Lanzhou City, Gansu Province, China.

After consulting relevant literature (Pearce and Cribb 2002; Pridgeon et al. 2005; Liu et al. 2008; Chen et al. 2009; Yang et al. 2009; Feng and Jin 2010; Jin 2010, 2011; Wu et al. 2012; Hsu 2013; Li and Yan 2013; Su et al. 2014; Su et al. 2015; Tang et al. 2015; Li et al. 2019; Ya et al. 2021) and examining scans of type specimens and other relevant herbarium specimens of *Liparis* available online from AMES, BM, E, L, K, P and PE (acronyms following Thiers, continuously updated), JSTOR Global Plants (<http://plants.jstor.org>), China National Specimen Information Infrastructure NSII (<http://www.nsii.org.cn/2017/home-en.php>) and The Chinese Virtual Herbarium NPSRC (<http://www.cvh.ac.cn>), the taxonomic status of the putative new species and morphologically similar species were investigated.

## Taxonomic treatment

*Liparis tianchiensis* X.J.Liu & X.G.Sun, sp. nov.

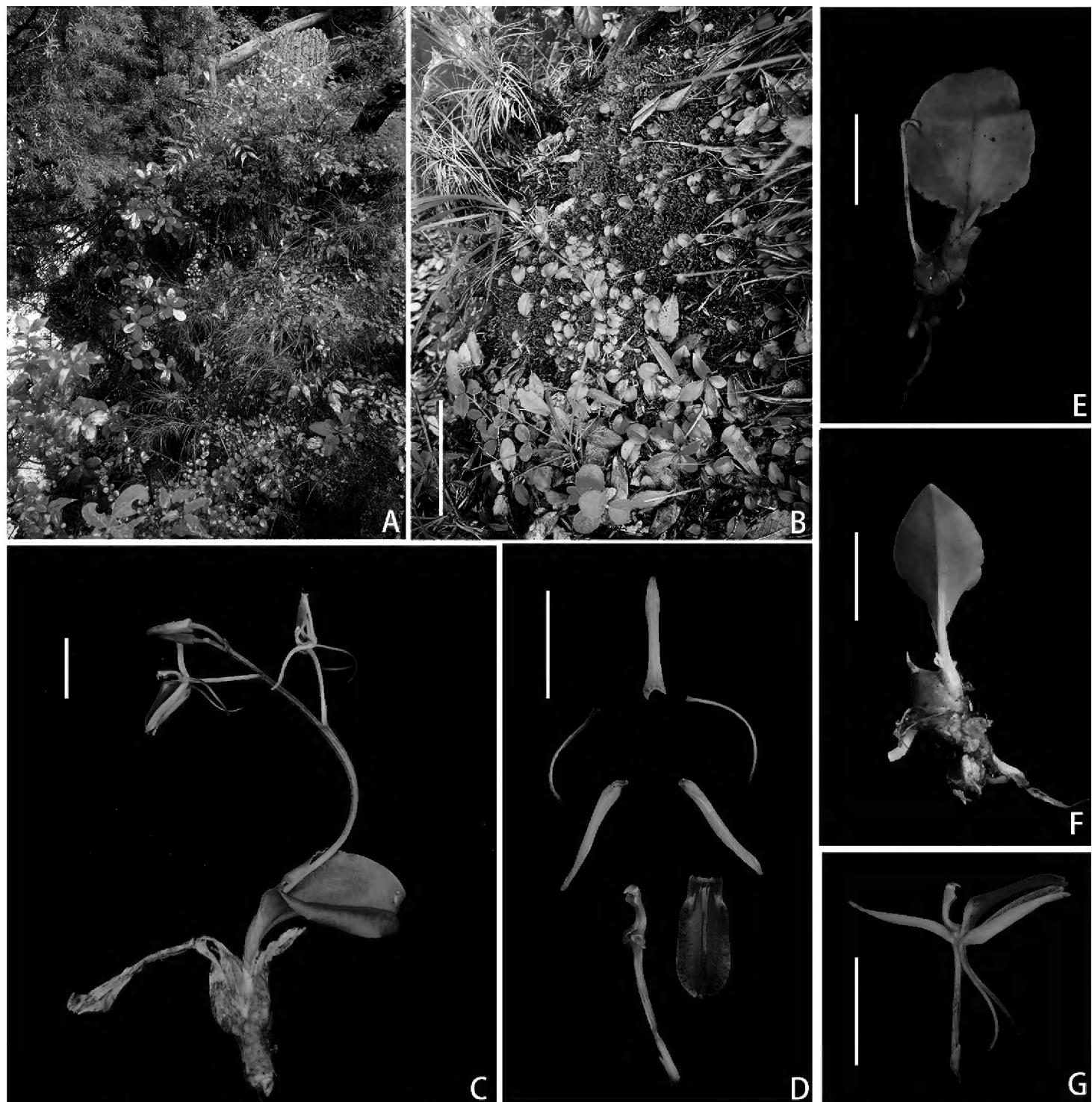
urn:lsid:ipni.org:names:77312597-1

Figs 1, 2

**Type.** CHINA. Gansu Province, Longnan City, Wenxian County, Tianchi Lake, growing on moss in evergreen broad-leaved forest, elev. 1680 m, 15 July 2021, X.J. Liu & H. Lin, WX20210715001 (holotype: GAUF!, isotype: GAUF!).

**Diagnosis.** *Liparis tianchiensis* is similar to *L. damingshanensis* with single small leaf, erect, lax flowered-inflorescences, small greenish purple flowers, spreading sepals, free reflexed and linear petals, a lip with 2 calli near the base and an arcuate column. It, however, differs from the latter by having a longer dorsal sepal (9.0–11.0 mm vs 6.0–8.0 mm) and a longer (8.0–10.0 vs 5.0–7.0 mm) and oblong (vs obovate-triangular) lip.

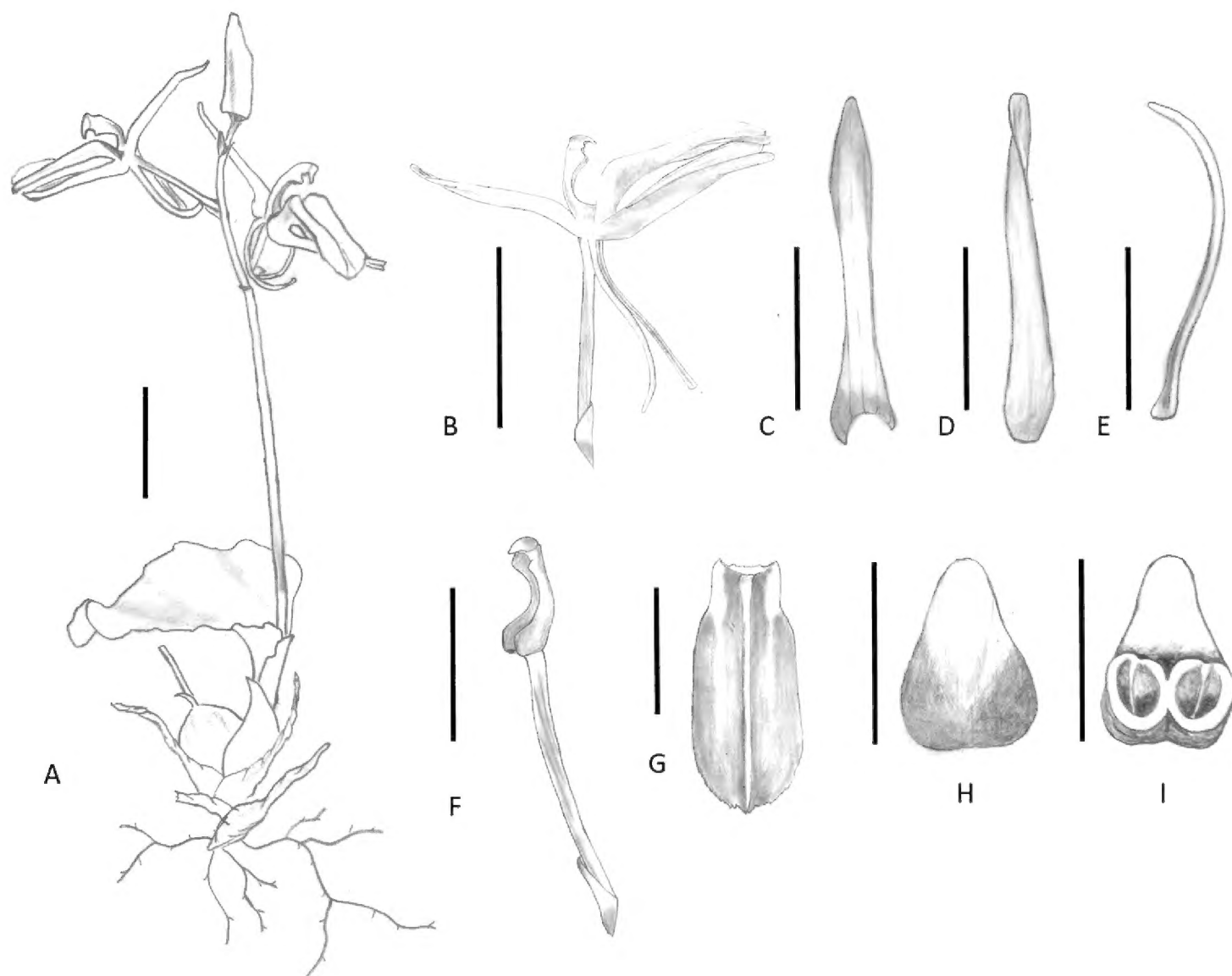
**Description.** Terrestrial herbs. Pseudobulbs ovoid or oblong-ovoid, 0.5–1.5 cm long, 0.4–1.0 cm in diameter, covered with white membranous remnant sheaths. Leaf single, green, glabrous, petiole sheath like, 0.5–1.0 cm long, amplexicaul, not articulate; blade ovate, 1.2–3.0 cm × 1.0–2.0 cm, contracted and decurrent into petiole at base and acute or obtuse at apex, margin entire and flat or slightly undulate. Inflorescence 4.0–9.0 cm long; peduncle slightly compressed cylindrical, narrowly winged on either side; rachis laxly 2–4-flowered; floral bracts ovate-triangular, 2.0–3.0 mm long, membranous, greenish-white. Flowers fully opening, greenish-purple, 1.6–2.2 cm across; pedicel and ovary greenish-purple, twisted, 1.0–1.2 cm long. Dorsal sepal



**Figure 1.** *Liparis tianchiensis* sp. nov. **A** habit **B** non-flowering plants *in situ* **C** flowering individual **D** dissected floral parts **E** leaf, adaxial view **F** leaf, abaxial view **G** flower, lateral view. Scale bars: 10 cm (**B**); 1 cm (**C–G**).

ovate-oblong, margins often revolute, apex obtuse, 9.0–11.0 mm × ca. 1.0 mm, translucent greenish-white. Lateral sepals parallel under the lip, obliquely ovate-elliptic, margins often revolute, apex obtuse, 8.0–11.0 mm × ca. 1.0 mm, translucent greenish-white. Petals deflexed, narrowly oblong-falcate, margins revolute, 8.0–10.0 mm × 0.3–0.5 mm, purple. Lip oblong, 8.0–10.0 mm × 3.0–5.0 mm, pale purple, with 2 short longitudinal triangular lamellae at the shallowly concave base, mucronate at apex; mid-vein dull-purple, broad and stout, conspicuous from the base up to the apex. Column conspicuously incurved, 4.0–5.0 mm long, ca. 1 mm in diameter, apex with 2 short, triangular wings, base purple and swollen; anther-cap obovate, glabrous; pollinia four in two pairs, yellow. Fruit not observed.

**Etymology.** The specific epithet is derived from the type locality Tianchi Lake, Wenxian County, Gansu Province, China.



**Figure 2.** *Liparis tianchiensis* sp. nov. **A** individual in bloom **B** flower, lateral view **C** dorsal sepal **D** lateral sepal **E** petal **F** pedicel, ovary and column **G** lip **H** anther-cap, abaxial view **I** anther-cap, adaxial view. Scale bars: 1 cm (**A, B**); 0.5 cm (**C–G**); 1 mm (**H, I**). Drawn by Hui Lin from the holotype.

**Distribution and habitat.** *Liparis tianchiensis* is terrestrial and grows in shaded and damp moss-covered areas in evergreen broad-leaved forest, forming scattered colonies on the slopes of Tianchi Lake at 1680 m a.s.l. For the time being, *Liparis tianchiensis* is only known from the type locality. The subpopulation is small, with less than 200 individuals.

**Flowering phenology.** June and July.

### Key to *Liparis tianchiensis* and its related species

- 1 Pedicel and ovary shorter than 1.0 cm, lip apex connate along the margins...  
..... *Liparis mengziensis*
- Pedicel and ovary longer than 1.0 cm, lip apex flat..... 2
- 2 Flower size larger than 1.0 cm, leaf 2, very rarely 1 ..... *Liparis pauliana*
- Flower size not larger than 1.0 cm, leaf 1 ..... 3
- 3 Lip obovate-triangular, 5.0–7.0 × 5.0–6.0 mm, dorsal sepal 6.0–8.0 mm long ..... *Liparis damingshanensis*
- Lip oblong, 8.0–10.0 × 3.0–5.0 mm, dorsal sepal 9.0–11.0 mm long.....  
..... *Liparis tianchiensis*



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## References

- Boufford DE, Zhang WH (2008) *Spiranthes sunii* Boufford & Wen H. Zhang, sp. Nov.; A new rheophytic orchid from Gansu Province, China. *Harvard Papers in Botany* 13(2): 261–266. <https://doi.org/10.3100/1043-4534-13.2.261>
- Chase MW, Cameron KM, Freudenstein JV, Pridgeon AM, Salazar G, van den Berg C, Schuitman A (2015) An updated classification of Orchidaceae. *Botanical Journal of the Linnean Society* 177(2): 151–174. <https://doi.org/10.1111/boj.12234>
- Chen SC, Ormerod P, Wood JJ (2009) *Liparis* L.C. Richard. In: Wu ZY, Raven PH, Hong DY (Eds) *Flora of China* (Vol. 25). Science Press, Beijing & Missouri Botanical Garden Press, St. Louis, 211–228.
- Feng CL, Jin XH (2010) *Liparis guangxiensis* sp. nov. (Malaxideae: Orchidaceae) from China. *Nordic Journal of Botany* 28(6): 697–698. <https://doi.org/10.1111/j.1756-1051.2009.00755.x>
- Hsu TC (2013) Two new species of *Liparis* (Orchidaceae) from Taiwan. *Taiwania* 58(1): 1–6.
- Ihsan A (2008) *Cardamine tianqingiae* (Brassicaceae), a new species from Gansu Province, China. *Harvard Papers in Botany* 13(1): 89–91. [https://doi.org/10.3100/1043-4534\(2008\)13\[89:CTBANS\]2.0.CO;2](https://doi.org/10.3100/1043-4534(2008)13[89:CTBANS]2.0.CO;2)
- Jin XH (2010) *Liparis cordifolia* var. *gongshanensis* (Orchidaceae, Malaxideae), a new variety from Yunnan, China. *Novon* 20(3): 282–284. <https://doi.org/10.3417/2008131>
- Jin XH (2011) *Liparis cheniana* (Malaxideae: Orchidaceae), a new species from Xizang, China. *Annales Botanici Fennici* 48(2): 163–165. <https://doi.org/10.5735/085.048.0210>
- Li LQ (2014) *Plants in Baishuijiang State Nature Reserve, Gansu Province, China*. Science Press, Beijing, 4 pp.
- Li L, Yan HF (2013) A remarkable new species of *Liparis* (Orchidaceae) from China and its phylogenetic implications. *PLoS ONE* 8(11): e78112. <https://doi.org/10.1371/journal.pone.0078112>
- Li L, Chung SW, Li B, Zeng SJ, Yan HF, Li SJ (2019) *Liparis napoensis* (Orchidaceae), a new species from Guangxi, China. *PhytoKeys* 119: 31–37. <https://doi.org/10.3897/phytokeys.119.32041>
- Lindley J (1830) *The Genera and Species of Orchidaceous Plants*. London, 15–17. <https://doi.org/10.5962/bhl.title.120492>
- Liu XJ, Sun XG (2021) *Oreocharis wenxianensis* (Gesneriaceae), a New Species from Gansu Province, China. *Annales Botanici Fennici* 58(1–3): 181–187. <https://doi.org/10.5735/085.058.0120>

- Liu ZJ, Chen SC, Chen LJ (2008) *Ypsilorchis* and Ypsilorchidinae, a new genus and a new subtribe of Orchidaceae. *Journal of Systematics and Evolution* 46(4): 622–627. <https://doi.org/10.3724/SP.J.1002.2008.08082>
- Margońska HB, Szlachetko DL (2001) *Alatiliparis* (Orchidaceae: Malaxidinae), a new orchid genus with two species from Sumatra. *Annales Botanici Fennici* 38: 77–81.
- Margońska HB, Szlachetko DL (2004) *Disticholiparis*, a new genus of subtribe Malaxidinae. *Orchidee* (Hamburg) 55: 175–179.
- Pearce NR, Cribb PJ (2002) Flora of Bhutan, vol. 3 part 3: The Orchids of Bhutan. Royal Botanic Garden Edinburgh & Royal Government of Bhutan, 195–212. Plants of the World Online. <https://powo.science.kew.org/> [Accessed 20 November 2022]
- Pridgeon AM, Cribb PJ, Chase MW, Rasmussen FN (2005) Genera *Orchidacearum*, vol. 4: Epidendroideae (Part one). Oxford University Press, Oxford, 465–471.
- Richard LC (1817) De Orchideis Europaeis Annotations. Belin, 21 pp. [30, 38] <https://doi.org/10.5962/bhl.title.15465>
- Schumann KM, Lauterbach CAG (1905) Nachträge zur Flora der Deutschen Schutzgebiete in der Südsee: mit Ausschluss Samoa's und der Karolinen. Gebrüder Borntraeger, Leipzig, 107 pp.
- Su YY, Meng Y, Shi Y, Tang GD, Liu ZJ (2014) *Liparis funingensis* (Orchidaceae; Epidendroideae; Malaxidae), a new species from Yunnan, China: Evidence from morphology and DNA. *Phytotaxa* 166(1): 85–93. <https://doi.org/10.11646/phytotaxa.166.1.6>
- Su YY, Huang YL, Chen LJ, Zhang PW, Liu ZJ, Zhang GQ (2015) *Liparis wenshanensis*, a new orchid from Yunnan: Evidence from morphology and molecular analyses. *Phytotaxa* 204(4): 253–264. <https://doi.org/10.11646/phytotaxa.204.4.2>
- Swartz O (1788) *Malaxis*. Nova Genera and Species Plantarum seu Prodomus. Swederi, Stockholm, 118–126.
- Tang GD, Zhang GQ, Hong WJ, Liu ZJ, Zhuang XY (2015) Phylogenetic analysis of Malaxideae (Orchidaceae: Epidendroideae): two new species based on the combined nrDNA ITS and chloroplast *matK* sequences. *Guihaia* 35(4): 447–463. <https://doi.org/10.11931/guihaia.gxzw201506015>
- Wang WT (2010) A new name and a new species of *Vitis* L. (Vitaceae) from China. *Guangxi Zhi Wu* 30(3): 287–289.
- Wang WT, Li LQ (2011) *Clematis austrogansuensis*, a new species of Ranunculaceae from Gansu. *Guihaia* 31(3): 285–287. <https://doi.org/10.3969/j.issn.1000-3142.2011.05.001>
- Wu L, Huang YS, Yang JC, Xu WB (2012) *Liparis damingshanensis* (Orchidaceae), a new species from Guangxi, China. *Taiwania* 57(1): 62–66.
- Ya JD, Lin DL, Han ZD, Cai L, Zhang ZR, He DM, Jin XH, Yu WB (2021) Three new species of *Liparis* s.l. (Orchidaceae: Malaxideae) from Southwest China based on morphological characters and phylogenetic evidence. *Plant Diversity* 43(5): 401–408. <https://doi.org/10.1016/j.pld.2021.01.006>
- Yang PH, Jin XH, Wu ZH (2009) *Liparis angustioblonga* sp. nov. (Malaxideae: Orchidaceae) from Shaanxi, China. *Nordic Journal of Botany* 27(4): 348–350. <https://doi.org/10.1111/j.1756-1051.2009.00473.x>
- Zhang XJ, Kuang TH, Chen JT, Li LJ, Peng JY, Guan KL, Huang XH, Wang HC, Deng T (2022) *Saxifraga sunhangiana* (Saxifragaceae), a new species from Gansu, China. *Taiwania* 67(2): 195–200. <https://doi.org/10.6165/tai.2022.67.195>